

WHAT IS CLAIMED IS:

1. A method of aligning a substrate having first and second substrate marks to a plurality of reference marks, said method comprising:

providing an alignment beam;

detecting an inclination of said alignment beam relative to a substrate table holding the substrate, said substrate table having a mark;

adjusting said alignment beam to be perpendicular to said substrate table;

aligning a first said reference mark with said mark of said substrate table using said alignment beam; and

aligning said first reference mark with said first substrate mark using said alignment beam.

2. The method of aligning a substrate according to claim 1, further comprising aligning said first reference mark with said second substrate mark using said alignment beam.

3. The method of aligning a substrate according to claim 1, wherein said detecting an inclination of said alignment beam relative to said substrate table comprises:

detecting a first position of said mark on said substrate table relative to said alignment beam;

moving said substrate table in a direction perpendicular to a top surface of said substrate table; and

detecting a second position of said mark on said substrate table relative to said alignment beam,

wherein a difference between said first and second relative positions indicates an inclination of the alignment beam relative to said substrate table.

4. The method of aligning a substrate according to claim 1, further comprising aligning a second said reference mark with said mark of said substrate table using said alignment beam.

5. The method of aligning a substrate according to claim 4, further comprising aligning said second reference mark with said first substrate mark using said alignment beam.

6. The method of aligning a substrate according to claim 1, wherein said using said alignment beam comprises projecting said alignment beam towards one of a substrate mark and the mark on said substrate table such that the beam is deflected through a reference mark.

7. The method of aligning a substrate according to claim 1, further comprising providing a mask on which said reference marks are arranged.

8. The method of aligning a substrate according to claim 1, wherein said substrate has a plurality of layers, the substrate marks being on a first layer visible through windows in a second layer.

9. The method of aligning a substrate according to claim 1,
wherein said alignment beam is adjusted to be perpendicular to said substrate.

10. A device manufacturing method comprising:

providing a substrate that is at least partially covered by a layer of radiation-sensitive material and that has first and second substrate marks;

providing a projection beam of radiation using a radiation system;

using patterning structure to endow the projection beam with a pattern in its cross-section;

projecting the patterned beam of radiation onto a target portion of the layer of radiation-sensitive material;

providing an alignment beam;

detecting an inclination of said alignment beam relative to a substrate table holding the substrate, said substrate table having a mark;

adjusting said alignment beam to be perpendicular to said substrate table;

aligning a first reference mark with said mark of said substrate table using said alignment beam; and

aligning said first reference mark with said first substrate mark using said alignment beam.

11. The device manufacturing method according to claim 10, wherein said detecting an inclination of said alignment beam relative to said substrate table comprises:

detecting a first position of said mark on said substrate table relative to said alignment beam;

moving said substrate table in a direction perpendicular to a top surface of said substrate table; and

detecting a second position of said mark on said substrate table relative to said alignment beam,

wherein a difference between said first and second relative positions indicates an inclination of the alignment beam relative to said substrate table.

12. The method of aligning a substrate according to claim 10, further comprising aligning a second reference mark with said mark of said substrate table using said alignment beam.

13. The device manufacturing method according to claim 12, further comprising aligning said second reference mark with said first substrate mark using said alignment beam.

14. The device manufacturing method according to claim 10, wherein said using said alignment beam comprises projecting said alignment beam towards one of a substrate mark and the mark on said substrate table such that the beam is deflected through a reference mark.

15. The device manufacturing method according to claim 10, further comprising providing a mask on which said reference marks are arranged.

16. The device manufacturing method according to claim 10, wherein said substrate has a plurality of layers, the substrate marks being on a first layer visible through windows in a second layer.

17. A device manufactured according to the method of claim 10.

18. A computer program comprising a plurality of instructions that, when executed on a computer system, instructs an apparatus to perform the device manufacturing method according to claim 10.

19. A computer program comprising a plurality of instructions that, when executed on a computer system, instructs an apparatus to perform the method of aligning a substrate according to claim 1.

20. The computer program according to claim 19, wherein said detecting an inclination of said alignment beam relative to said substrate table comprises:

detecting a first position of said mark on said substrate table relative to said alignment beam;

moving said substrate table in a direction perpendicular to a top surface of said substrate table; and

detecting a second position of said mark on said substrate table relative to said alignment beam,

wherein a difference between said first and second relative positions indicates an inclination of the alignment beam relative to said substrate table.

21. The computer program according to claim 19, wherein said method further comprises aligning a second reference mark with said first substrate mark using said alignment beam.

22. The computer program according to claim 19, wherein said using said alignment beam comprises projecting said alignment beam towards one of a substrate mark and the mark on said substrate table such that the beam is deflected through a reference mark.

23. A method of aligning a substrate, said method comprising:

providing an alignment beam;

detecting a first position, relative to said alignment beam, of a mark on a substrate table holding the substrate;

moving said substrate table in a direction perpendicular to a top surface of said substrate table;

detecting a second position, relative to said alignment beam, of said mark on said substrate table;

calculating an inclination of the alignment beam relative to said substrate table based on a difference between said first and second relative positions;

based on said inclination, adjusting said alignment beam to be perpendicular to said substrate table; and

subsequent to said adjusting, aligning a reference mark with a mark of the substrate using said alignment beam.